W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report (i)

May 15, 2020 – 02:42 pm BST

PDB ID	:	1U3Q
Title	:	Crystal Structure of Estrogen Receptor beta complexed with CL-272
Authors	:	Malamas, M.S.; Manas, E.S.; McDevitt, R.E.; Gunawan, I.; Xu, Z.B.; Collini, M.D.; Miller, C.P.; Dinh, T.; Henderson, R.A.; Keith Jr., J.C.; Harris, H.A.
Deposited on	:	2004-07-22
Resolution	:	2.40 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.
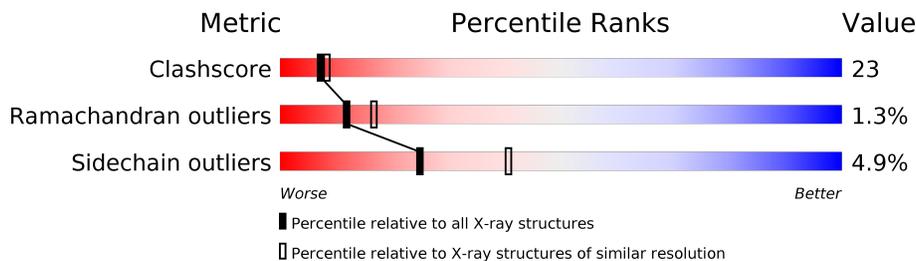
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Note EDS was not executed.

| Mol	Chain	Length	Quality of chain
1	A	240	57% 33% 5% 6%
1	B	240	53% 38% · · 5%
1	C	240	57% 33% · 6%
1	D	240	64% 26% · 6%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 7453 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Estrogen receptor beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	226	Total	C	N	O	S	0	0	0
			1788	1150	300	318	20			
1	B	227	Total	C	N	O	S	0	0	0
			1789	1148	301	320	20			
1	C	226	Total	C	N	O	S	0	0	0
			1788	1150	300	318	20			
1	D	226	Total	C	N	O	S	0	0	0
			1788	1150	300	318	20			

- Molecule 2 is 4-(6-HYDROXY-BENZO[D]ISOXAZOL-3-YL)BENZENE-1,3-DIOL (three-letter code: 272) (formula: $C_{13}H_9NO_4$).
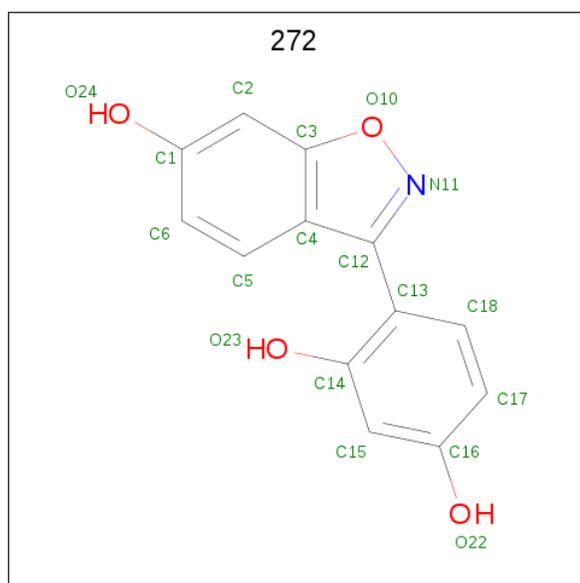
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			18	13	1	4		
2	B	1	Total	C	N	O	0	0
			18	13	1	4		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	C	1	Total 18	C 13	N 1	O 4	0	0
2	D	1	Total 18	C 13	N 1	O 4	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	63	Total 63	O 63	0	0
3	B	65	Total 65	O 65	0	0
3	C	38	Total 38	O 38	0	0
3	D	62	Total 62	O 62	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic s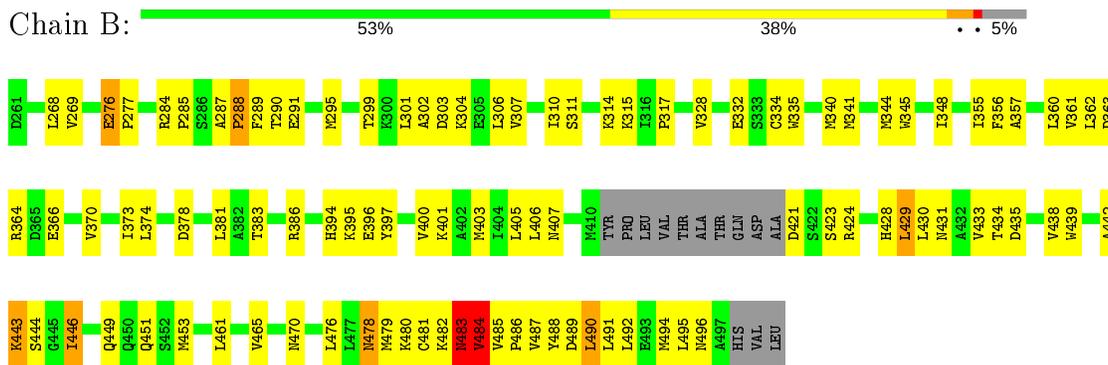hows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

Note EDS was not executed.

- Molecule 1: Estrogen receptor beta
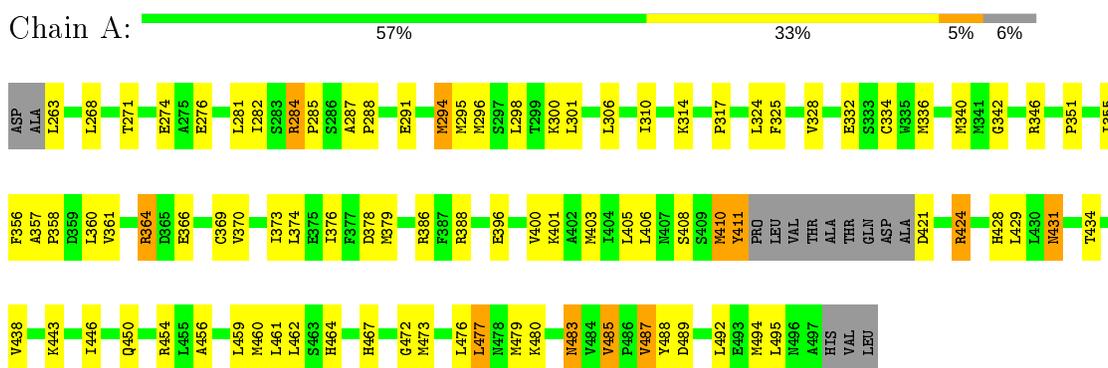
- Molecule 1: Estrogen receptor beta

- Molecule 1: Estrogen receptor beta

A436 W439 K443 S447 M453 R454 L461 V465 R466 G472 M473 E474 N478 C481 K482 N483 V484 V485 P486 V487 Y488 D489 L492 E493 M494 L495 N496 A497 HIS VAL LEU
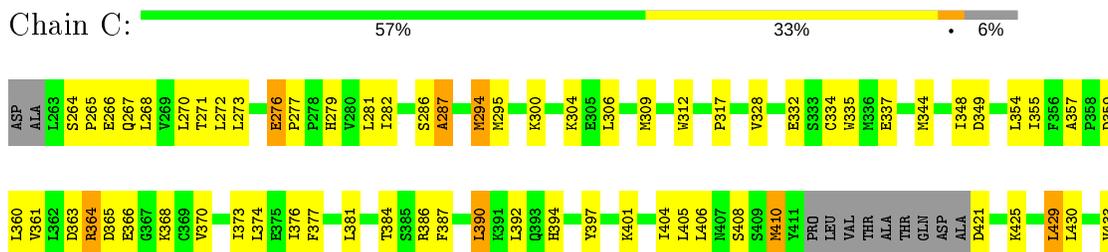
• Molecule 1: Estrogen receptor beta

Chain D:

64%   26%   •   6%

ASP ALA L263 E276 H279 V280 L281 I282 T290 E291 M295 M296 S297 L298 T299 K300 L301 K304 E305 I310 K314 P317 G318 F319 V320 F325 V328 R329 L330 L331 E332 W335 M336 E337 K353 L354 I355 F356 A357 L360 V361 L362 D363 R364 D365 E366 G367

K368 I373 L374 M379 S385 R386 F387 R388 L398 C399 V400 K401 I404 S409 M410 Y411 PRO LEU VAL THR ALA THR GLN ASP ALA D421 R424 K425 L426 A427 H428 L429 L430 N431 W439 V440 I441 A442 K443 S444 G445 I446 Q451 R454 L461 H464 V465 R466

K471 G472 M473 L476 V487 Y488 D489 L492 L495 N496 A497 HIS VAL LEU

4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	77.17Å 76.65Å 82.80Å 90.00° 111.83° 90.00°	Depositor
Resolution (Å)	14.95 – 2.40	Depositor
% Data completeness (in resolution range)	(Not available) (14.95-2.40)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.227 , 0.279	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	7453	wwPDB-VP
Average B, all atoms (Å^2)	39.0	wwPDB-VP

5   Model quality   ⓘ

5.1   Standard geometry   ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: 272

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$>5	RMSZ	#$|Z|$>5
1	A	0.36	0/1820	0.58	0/2456
1	B	0.35	0/1820	0.58	0/2456
1	C	0.40	1/1820 (0.1%)	0.57	0/2456
1	D	0.39	0/1820	0.60	0/2456
All	All	0.38	1/7280 (0.0%)	0.58	0/9824

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	478	ASN	C-N	6.99	1.50	1.34

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts   ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1788	0	1864	94	0
1	B	1789	0	1864	102	0
1	C	1788	0	1864	82	0
1	D	1788	0	1864	74	0
2	A	18	0	6	0	0
2	B	18	0	6	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	18	0	6	0	0
2	D	18	0	6	1	0
3	A	63	0	0	3	0
3	B	65	0	0	4	0
3	C	38	0	0	3	0
3	D	62	0	0	4	0
All	All	7453	0	7480	332	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 23.

The worst 5 of 332 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:478:ASN:ND2	1:B:482:LYS:HE3	1.47	1.27
1:B:478:ASN:HD21	1:B:482:LYS:CE	1.63	1.09
1:B:481:CYS:HB3	1:C:368:LYS:HE2	1.41	1.01
1:C:295:MET:HB3	1:C:485:VAL:HG21	1.51	0.92
1:A:477:LEU:HD13	1:A:495:LEU:HD22	1.53	0.89

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	222/240 (92%)	205 (92%)	15 (7%)	2 (1%)	17	25
1	B	223/240 (93%)	206 (92%)	13 (6%)	4 (2%)	8	10
1	C	222/240 (92%)	209 (94%)	10 (4%)	3 (1%)	11	15
1	D	222/240 (92%)	215 (97%)	4 (2%)	3 (1%)	11	15
All	All	889/960 (93%)	835 (94%)	42 (5%)	12 (1%)	12	17

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	489	ASP
1	B	446	ILE
1	B	484	VAL
1	D	446	ILE
1	B	483	ASN

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	204/215 (95%)	194 (95%)	10 (5%)	25	40
1	B	204/215 (95%)	195 (96%)	9 (4%)	28	45
1	C	204/215 (95%)	192 (94%)	12 (6%)	19	32
1	D	204/215 (95%)	195 (96%)	9 (4%)	28	45
All	All	816/860 (95%)	776 (95%)	40 (5%)	25	40

5 of 40 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	490	LEU
1	C	359	ASP
1	D	409	SER
1	C	279	HIS
1	C	364	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 22 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	478	ASN
1	C	267	GLN
1	D	464	HIS
1	B	483	ASN
1	B	496	ASN

5.3.3   RNA (i)

There are no RNA molecules in this entry.

5.4   Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5   Carbohydrates (i)

There are no carbohydrates in this entry.

5.6   Ligand geometry (i)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
2	272	A	501	-	17,20,20	3.61	14 (82%)	21,29,29	1.41	2 (9%)
2	272	D	501	-	17,20,20	3.47	11 (64%)	21,29,29	1.42	4 (19%)
2	272	B	501	-	17,20,20	3.42	13 (76%)	21,29,29	1.23	3 (14%)
2	272	C	501	-	17,20,20	3.49	12 (70%)	21,29,29	1.48	5 (23%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	272	A	501	-	-	2/2/4/4	0/3/3/3
2	272	D	501	-	-	2/2/4/4	0/3/3/3
2	272	B	501	-	-	2/2/4/4	0/3/3/3
2	272	C	501	-	-	2/2/4/4	0/3/3/3

The worst 5 of 50 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	272	O23-C14	-6.58	1.23	1.36
2	C	501	272	O23-C14	-6.56	1.23	1.36
2	D	501	272	O23-C14	-6.55	1.23	1.36
2	B	501	272	O23-C14	-6.48	1.23	1.36
2	C	501	272	O24-C1	-6.12	1.22	1.37

The worst 5 of 14 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	501	272	C13-C12-C4	3.18	133.99	124.50
2	A	501	272	C13-C12-C4	3.12	133.81	124.50
2	D	501	272	C13-C12-C4	2.98	133.40	124.50
2	C	501	272	C5-C4-C3	-2.78	118.62	120.38
2	B	501	272	C13-C12-C4	2.71	132.60	124.50

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	272	C4-C12-C13-C18
2	D	501	272	C4-C12-C13-C18
2	B	501	272	C4-C12-C13-C18
2	C	501	272	C4-C12-C13-C18
2	A	501	272	N11-C12-C13-C18

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	501	272	1	0
2	B	501	272	1	0

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains (i)

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates (i)

EDS was not executed - this section is therefore empty.

6.4 Ligands (i)

EDS was not executed - this section is therefore empty.

6.5 Other polymers (i)

EDS was not executed - this section is therefore empty.